

any given source, and the author shows how the flow deductions can be estimated from the precipitations, that is, the amount of water obtained from rainfall, &c. He points out how, in one case, the failure to study this caused a syndicate to credit a certain source of output with 3500 h.p., where, as a matter of fact, the "opportunity" was good for about 1500 h.p., with 250 h.p. auxiliary plant to supplement the three months' low-flow output. It will be seen, therefore, that the reading of this book will help to prevent the investor from putting his money into "wild-cat schemes."

Part ii., as already mentioned, is for the practical man, and certainly contains too many formulæ for the uninitiated, although these are absolutely essential to the engineer. This portion of the book commences with a survey which embraces all operations by which the hydrographic, topographic, and geological characteristics are investigated.

Having obtained the data furnished by a careful survey, the next chapter deals with the development programme, and this part is remarkably well illustrated by means of line blocks, showing different methods of development; for instance, direct development in rocky gorge, short diversion development, distant development, and so on.

The space at our disposal will not allow us to go more fully into this extremely interesting work. The half-tone illustrations of various power houses and power schemes are exceedingly well got up, and are a valuable aid to the reader. It only remains to say that the author is to be congratulated upon having brought out a book which is useful to the general public, and also of great value to the specialist.

SOME NEW CHEMICAL BOOKS

- (1) *Technical Chemists' Handbook*. By Dr. G. Lunge. Pp. xv+260. (London: Gurney and Jackson, 1908.) Price 10s. 6d. net.
- (2) *Exercises in Elementary Quantitative Chemical Analysis for Students of Agriculture*. By Dr. A. T. Lincoln and Dr. J. H. Walton, jun. Pp. xv+218. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1908.) Price 6s. 6d. net.
- (3) *Laboratory Manual of Qualitative Analysis*. By W. Segerblom. Pp. xii+136. (London: Longmans, Green and Co., 1908.) Price 3s. 6d.
- (4) *Synthetic Inorganic Chemistry*. By Dr. A. A. Blanchard. Pp. viii+89. (New York: J. Wiley and Sons; London: Chapman and Hall, Ltd., 1908.) Price 4s. 6d. net.
- (5) *The Fundamental Conceptions of Chemistry*. By Dr. S. M. Jørgensen. Translated by M. P. Appleby. Pp. viii+175. (London: Society for the Promotion of Christian Knowledge, 1908.) Price 2s. 6d.
- (6) *Kurzes Repetitorium der Chemie*. I., Anorganische Chemie. By Dr. E. Bryk. Breitenstein's Repetitorien, No 7. Pp. iv+244. (Leipzig: J. A. Barth, 1908.) Price 2.85 marks.

(1) DR. Lunge's "Technical Chemists' Handbook" is a new and revised edition of the extremely useful little volume, well known under the title of "The Alkali Makers' Pocket-book," and later as NO. 2043, VOL. 79]

"The Alkali Makers' Handbook." In many respects the new volume, in the preparation of which the author has had the assistance of Dr. Berl, is unlike its predecessors, which were intended mainly for the laboratory of the alkali maker. The scope is greatly enlarged, and covers a variety of industries. The old material is brought up to date, and there are new chapters on water for boilers, on coal gas and its products, on calcium carbide and acetylene, on fertilisers, aluminium salts, and calcareous cements. The book, although intended for the works, will also be found useful in a college laboratory in training the future professional chemist. It possesses, it may be added, a great advantage over many technical handbooks, for it embodies the results of long personal experience, and, being restricted in its scope, can afford space to enter into the minutiae of each operation.

(2) The volume by Drs. Lincoln and Walton is intended for agricultural students. The first half is an introduction to the methods of ordinary quantitative analysis, and is written with great care and thoroughness. It might include with advantage a few more gravimetric exercises. The second part is technical, and is devoted to the analysis of milk, butter, food-stuffs, fertilisers, and soils, and concludes with analytical problems and methods of calculation under the title "stoichiometry." There is little which calls for criticism, for the volume is evidently written by experts who are thoroughly *au fait* with their subject. We would only direct attention to the fact that the standards given are mainly those of the U.S. Department of Agriculture, which are not in force in this country. The same may be said of some of the apparatus and methods. The Babcock method is, we believe, not used here, and the Hanus method is a modification of what is generally known as Hübl's method. It might be well to include in a subsequent reprint a figure of the Reichert-Meissl apparatus, and details of dimensions which are essential. The method of estimating potassium in soils is not given in sufficient detail for those special cases where modifications may be necessary.

(3) It is difficult to realise the particular aspect of qualitative analysis which compels teachers to add to the already extensive literature on the subject. It is rarely that one finds a new arrangement, new tests, new apparatus, or new reactions. The order of the groups, the disposition of principal and subgroups, and the general and special reagents, are always the same. We have examined Mr. Segerblom's volume in vain for something new or suggestive. We are inclined to question the utility of general definitions at the beginning of a book, and certainly some of those given are not very happy. "A reaction," we are told, "is any phenomenon exhibited by a substance." According to this, the breaking of glass would be a reaction. Although there is nothing that strikes one as new, it may be said that the description of the different operations is full and clear; the book is excellently printed, and there is a useful appendix of "study questions" to beguile the student's leisure.

(4) The little volume entitled "Synthetic Inorganic Chemistry" contains a description of a series of simple preparations of metallic compounds, and is

designed for the use of students in their second college term. Each preparation is introduced by a short theoretical discussion of the reaction involved, followed by details of procedure, and a number of suggestive questions which the student is required to answer in his note-book. The scheme is excellent, and if conscientiously followed should afford an intelligent student the full benefit of each experiment. He is not supposed to work right through the book, but the experiments are to be distributed among the students, who are encouraged to be inquisitive as regards their neighbours' activities, and so acquire indirectly all that the book contains. Considering that the matter is not very original, that there are no illustrations, and only eighty-nine pages of print, the price of 4s. 6d. seems rather high.

(5) If "The Fundamental Conceptions of Chemistry" were printed as an *aide-mémoire* for a candidate for the Inter. B.Sc., we should consider that the 179 small pages of compressed general chemistry might serve a useful if not very dignified purpose. The book is full of facts and theories laid down in didactic fashion and with that want of precision and clear exposition which characterise the tutorial text-book. We cannot agree with the author that the book will "accustom the student to the methods of chemical reasoning," unless, of course, chemical reasoning is, as one is sometimes inclined to think, a different mental process from other kinds of reasoning. Nor do we agree with him in admiring the elegance displayed in the get-up of his book. We must, however, commend one special feature, namely, the historical references, which are numerous and generally accurate. It is interesting to learn the Christian names of chemists, who do not usually appear to have any. Such, for example, are Cato Maximilian Guldberg, Peter Waage, and Eilhardt Mitscherlich; Dulong and Petit are, however, coupled together, as usual, without Christian names. We should dissent from Dalton being described as a Manchester schoolmaster, and from the statement that owing to the discovery of oxygen, "Lavoisier was able to realise what Mayow's genius had arrived at a hundred years before."

(6) Dr. Bryk's "Repetitorium" is what it professes to be—a mere compilation of important facts to assist the student's memory. It has been put together apparently with great care, and there are many useful tables containing a general summary of compounds of different elements. To anyone desirous of assimilating large quantities of information, the book may be safely commended; but we cannot promise that he will be intellectually stimulated by its perusal.

J. B. C.

OUR BOOK SHELF.

Experimental Elasticity. A Manual for the Laboratory. By G. F. C. Searle, F.R.S. Pp. xvi+187. (Cambridge: University Press, 1908.) Price 5s. net. THE author has embodied in this volume in a connected form the contents of a number of manuscripts which he had from time to time written for the use of students attending his class in practical physics at the Cavendish Laboratory. Chapters i. and ii., consisting of 70 pages, give an account of the elementary theory

of elasticity, with solutions of some special mathematical problems. Chapter iii., pp. 71-161, describes the experiments—numbered 1 to 14—prescribed for the student. Pages 162-183 comprise ten short notes, mostly on mathematical subjects. There is a table of contents and an index.

The experiments, which relate mainly to the determination of Young's modulus and the rigidity in materials assumed isotropic, are very carefully described. The apparatus, which seems mostly designed by the author, is usually simple, and the student who goes through the course intelligently should have learned a good deal. The illustrations of Saint Venant's principle of "equipollent" systems of force in chapter ii., due to Dr. Filon, are likely to be useful.

Notwithstanding the merits of the book, it is a little difficult to picture a student for whom it would form the best possible introduction to the subject. The reader who requires the notes at the end seems hardly likely to follow the mathematical investigations into the differences between adiabatic and isothermal elasticity in chapter i., or into the bending of a rod and the bending and twisting of a blade in chapter ii. The ordinary student would probably get a better grasp of the mathematical theory of elasticity from a study of the ordinary stress-strain and surface equations, and their application to a few really simple problems.

The author's attitude towards the application of isotropic elasticity to wires leaves something to be desired. On p. 113 he gives a table of values of Poisson's ratio obtained by the method of one of his experiments. In five out of nine cases the value is impossible, exceeding 0.5. The impossibility, it is true, is pointed out, the phenomenon being ascribed to lack of isotropy. But this is much as if a temperance lecturer illustrated the evil effects of intemperance in his own person. A safer course would be to confine the table to cases where isotropy is at least not obviously untenable, adding a warning that wires are frequently neither isotropic nor homogeneous, and that absurd results are often obtained by assuming that they are. It would also be as well to let physical students know that isotropy is not the only type of elasticity amenable to mathematical treatment. Vibrations in thin wires are theoretically a less satisfactory method of finding elastic constants for materials than are vibrations in long rods, but possibly Mr. Searle is reserving vibrations in rods for one of the further volumes adumbrated in his preface.

C. CHREE.

Beautiful Flowers and How to Grow Them. To be completed in 17 parts. Edited by Horace J. Wright and Walter P. Wright. With 100 coloured plates. (London: T. C. and E. C. Jack.) Price 1s. net each part.

THE first part is concerned entirely with roses, and includes twenty-four pages of letterpress. The writer discourses upon roses from the point of view of the garden decorator rather than that of the exhibitor, and, indeed, the mere exhibitor is given very little consideration. This is very natural in such a work as this, which is undoubtedly intended for amateurs who wish to grow flowers for their own sake alone, and not for the glory that attends the winning of prizes at competitive exhibitions.

The style is pleasant, and the reader is given an insight into the classification of roses in order to enable him to understand the characteristics of the numerous types. Even the novice may soon acquire some knowledge of the hybrid teas, teas, hybrid perpetuals, noisettes, moss rose, polyantha rose (*Rosa multiflora*), the Wichuraiana roses (including such esteemed varieties as Dorothy Perkins, Lady Gay, and Hiawatha), and other types. Some of these are